North Dakota Department of Agriculture

Amount Awarded: $3,153,470.64 **Number of Projects:** 37

Development of Super Confection Sunflower Effectively Resistant to Downy Mildew and Rust • Project Budget: $96,380.00

Partner with the National Sunflower Association to develop super confection sunflower germplasms with down mildew (DM) resistance combined with rust resistance by incorporating DM resistance identified in oil-type sunflower into confection sunflower, molecular mapping of DM resistance genes, and pyramiding DM and rust resistance genes in a single genetic background.

Improving Management of Fusarium Root Rot of Field Peas by Quantifying Impacts of Common Herbicides **• Project Budget:** $22,452.00 **Indirect Costs:** $0.00

Partner with North Dakota State University to assess whether any herbicides commonly used in a wheat/field pea crop rotation are associated with increased severity of Fusarium root rot of peas by conducting field experiments on land with a history of the disease to empirically test the impact of common herbicides on it.

Northern Plains Vegetable Variety Testing **• Project Budget:** $99,814.00

Partner with the Northern Plains Sustainable Agriculture Society to increase yields and quality of North Dakota-grown vegetables, create networks for sharing and collaborating on vegetable variety improvement, and increase knowledge of varietal differences through the identification of vegetable varieties that meet local climatic and environment challenges with highly marketable qualities.

Optimizing Fungicide Application Strategies for Improved Management of Sclerotinia in Dry Edible Beans **• Project Budget:** $50,074.00

Partner with North Dakota State University to identify optimal fungicide application strategies for control of Sclerotinia on dry beans relative to environmental conditions, plant architecture, and timing of canopy closure by conducting field studies on four dry edible bean varieties: two varieties each of pinto and navy beans, one with upright vine plant architecture and one with upright short vine architecture.

Local Foods Initiative **• Project Budget:** $211,382.20

Increase awareness of specialty crop production that builds the local foods movement and connects a community of supporters through social media outreach, restaurant program, radio promotion, and photo library.

North Dakota Specialty Crop Export Expansion Project **• Project Budget:** $99,998.00

Partner with the North Dakota Trade Office to increase sales of peas, beans, lentils, and confectionary sunflowers by conducting three outbound trade missions to Italy-Croatia, Colombia, and Israel, conducting one inbound trade mission for top prospects from each country to North Dakota, meeting prospective buyers in each of the four targeted countries, and increasing the U.S. and North Dakota market share in each country.

Discovery of Specific Starch Properties of NDSU Potato Germplasm for Nutritional and Industrial Applications • **Project Budget:** $51,128.00

Partner with North Dakota State University to aid potato producers and the industry in the northern plains in identifying potato genotypes suitable for innovative nutritional and diet products, bioplastics and other industrial applications, pharmaceutical uses, and novel food stuffs by evaluating diverse germplasm for starch attributes including total starch, resistant starch, and determinations of the amylase/amylpectin ratio.

Screening and Developing Lentil Cultivars Tolerant to Sulfentrazone • **Project Budget:** $37,208.00

Partner with North Dakota State University to identify at least one or more lentil cultivars with acceptable tolerance to sulfentrazone to aid in the development of additional cultivars by identifying lentil cultivars from different market classes and ancestry that are more tolerant to sulfentrazone using field, lab, and greenhouse methods, developing lab and greenhouse methods for cultivar screening that agree with field results, thus providing a fast, cost-effective technique to determine cultivar sensitivity, and developing tolerant lentil cultivars through mutagenic techniques.

Validation of Biochemical Markers to Predict Sugar End Development under Field Conditions • **Project Budget:** $16,805.00

Partner with North Dakota State University to evaluate predictive biochemical markers in potatoes and explore novel proteins associated with major post-harvest problems (SED and CIS) that will reduce economic losses and enhance the competitiveness of the Midwest potato industry in and across the US by evaluating known potato varieties for levels of A-II protein, associating levels of AII proteins with various parameters, and validating markers for SED under field conditions.

Contribution of Nematode Populations and Soil Properties in Root Rot of Peas • **Project Budget:** $75,205.00

Partner with North Dakota State University to identify nematode species in association with pea roots by utilizing molecular procedures, to quantify six Fusarium species from pea roots using previously developed real-time PCR assays, and to determine associations between soil properties, nematode populations, Fusarium species, and root rot of peas.

Research on Vegetable Production in Controlled Environment Systems • **Project Budget:** $77,500.00

Partner with North Dakota State University to help the growers of the newly emerging greenhouse vegetable industry with technical know-how by selecting the best performing cultivars of leaf lettuce including bib and Romaine lettuces for hydroponic culture, solving the occurrence of physiological disorder symptoms such as leaf margin burns and distortion on new growth in lettuce grown in the greenhouse, and optimizing nutrient solution for growing lettuce, tomato, and other vegetables in the greenhouse.

Assessing the Potential for Remote Sensing of Potato Virus Y in Potato Seed Fields • **Project Budget:** $53,028.00

Partner with North Dakota State University to assess the potential for remotely sensing potato virus Y (PVY) in seed and commercial potato fields by determining the wavelengths of reflected light that are associated with PVY of seed potato plants, determining if these wavelengths are discernible in the greenhouse and field for new cultivar releases, advanced selections, and commonly grown cultivars by North Dakota certified seed potato producers, determining if PVY strains are discernible from one another in the greenhouse and field using spectral data, and determining if PVY infection can be differentiated from nutrient deficiency (specifically nitrogen) in the greenhouse and field using spectral data.

Specialty Crop International Expansion • **Project Budget:** $104,585.00

Promote and increase sales for North Dakota‘s specialty crops internationally by connecting specialty crop exporters, commodity groups, and producers with foreign buyers through food export trade/buyers missions.

Studies on Cold Acclimation of Winter Legumes • **Project Budget:** $96,923.00

Partner with North Dakota State University to increase farm profitability and sustainability by expanding crop rotation options for Midwest growers to include fall-sown winter peas by developing a genetic map of two F7-derived mapping populations and identifying quantitative tati loci responsible for component traits of winter hardiness.

Enhance Potato Production and Marketing in Western North Dakota • **Project Budget:** $91,850.00

Partner with the Williston Ag Diversification Group to develop, evaluate, and advance newly bred and improved ―niche‖ market potato varieties by developing an additional 350+ lbs. of mini-tubers of MonDak Gold that meets state regulatory seed status for subsequent distribution to seed and commercial growers to meet the Mon-Dak Gold variety production demands from 2015 and beyond and by growing-out MonDak Gold mini-tubers in 2015 to

produce Generation 1 seed for both reinvestment as seed and for commercial potato growers for large scale production and marketing within the next three years.

Managing Blemish Problems to Improve Marketing of Fresh Potatoes • **Project Budget:** $46,266.00

Partner with North Dakota State University to reduce the loss of fresh market potatoes, primarily red- and yellow-skinned, to blemish problems that make them unmarketable by determining the blemish complex, surveying the types of blemishes that are currently causing loss, determining what agronomic management methods are available for controlling these blemishes – which include growth regulators, fungicide treatments, biological control agents, spent lime, and the use of fumigants – and screening multiple cultivars in the field for blemish-free tubers.

Growth and Fresh Yield Responses of Sweet Corn to Mulch, Planting Date, and Hybrid • **Project Budget:** $100,000.00

Partner with North Dakota State University to demonstrate an important way to plant sweet corn earlier, harvest earlier, increase its market value, and yield a higher income by evaluating sweet corn growth and fresh yield differences with four different type mulches (black, clear, biodegradable, and no mulch treatments) that will be planted at four different planting dates for three hybrids with maturity dates of 65, 75 and 85 days.

Determining the Casual Pathogen of a New Disease Affecting Dry Field Peas • **Project Budget:** $46,496.00

Partner with North Dakota State University to identify the pathogenic organism causing the uncharacterized dry pea disease by completing initial serological testing to identify potential viral candidates, testing for phytoplasm DNA, a secondary method for confirmation of the pathogen and modified Koch's postulates for non-culturable organisms.

Management of Potato Mop Top Tuber Necrosis Using Cultivars that Do Not Express the Disease • **Project Budget:** $47,615.00

Partner with North Dakota State University to determine the powdery scab and potato mop top virus (PMTV) induced tuber necrosis susceptibility of every potato cultivar used in the table, chip, and French fry market sector grown in the state of North Dakota by securing and quantifying susceptibility to PMTV-induced tuber necrosis against the known susceptibility of the cultivars assessed to date.

Farm Food Safety Training for Local Vegetable and Fruit Growers to Increase Sales and Success • **Project Budget:** $52,137.00

Partner with the Entrepreneurial Center for Horticulture at Dakota College at Bottineau to increase the number of small to mid-sized vegetable and fruit growers trained in farm food safety and beginning direct to consumer sales venues by providing farm food safety classes including training on Good Agricultural Practices and Good Handling Practices (GAP/GHP), preparation of farm food safety plans, farm business management, marketing, crop production, season extension and more.

Evaluation of Dry Bean Germplams for Tolerance to Waterlogging **• Project Budget:** $138,833.00

Partner with North Dakota State University to identify a group of at least 10 dry bean genotypes that will be more resilient or tolerant to waterlogging, especially at the early growth stages (germination, emergence, and vegetative growth) by evaluating a diverse group of approximately 700 dry bean genotypes for their tolerance to waterlogging under greenhouse conditions, testing tolerant genotypes in field condition, initiating crosses using the identified sources of waterlogging tolerance, and identifying the genomic regions associated with waterlogging tolerance.

Fort Yates Helping Hands Community Garden and Cannon Ball Garden to Table Greenhouses **• Project Budget:** $229,825.00

Partner with the Dakota Prairies Resource Conservation & Development Council to grow and strengthen the Helping Hands Community Garden in Fort Yates and create the new Garden to Table Greenhouses in Cannon Ball by increasing child and adult nutrition knowledge, increasing the consumption of locally-grown specialty crops to improve residents‘ health, and providing freshly dehydrated and vacuum sealed fresh fruits and vegetables to the reservation‘s residents that will be easy to store and consume during the winter when access to fresh food is difficult and expensive.

Defining Glyphosate and Dicamba Drift Injury Thresholds in Field Peas, Dry Beans **• Project Budget:** $90,042.00

Partner with North Dakota State University to establish a correlation between observed crop injury ratings and lab-tested glyphosate and dicamba levels in leaf samples by treating plants with three rates of glyphosate and dicamba alone or in combination, recording visible injury (along with pictures), harvesting plots, measuring yield/quality, and comparing observed values and lab-tested values.

Hop Selections for North Dakota **• Project Budget:** $98,125.00

Partner with North Dakota State University Williston Research Extension Center to educate the public about growing hops in the Upper Midwest by providing research results and disseminating the information with hop production management and variety recommendations to interested parties.

Ornamental Woody Plant Breeding **• Project Budget:** $34,061.00

Partner with North Dakota State University to increase the breeding efforts and germplasm collections for ornamental woody plants suited for the harsh North Dakota landscapes by developing a strong ornamental breeding program to include improvements with magnolia, maple and lilac germplasm, while also developing new ornamental cultivars suited for use in North Dakota and the Northern Great Plains.

Development of Low Glycemic Products Using Pulse Ingredients **• Project Budget:** $128,000.00

Partner with the Northern Pulse Growers Association to increase the usage of the region's peas, lentils and chickpeas in consumer's diets and to provide strong evidence of glycemic index (GI) of pulse in food items, by developing new low GI products with pulse flours including pasta, cookies, muffins, bread, crackers, quick bread, and extruded snack and snack bars, providing in vivo evidence showing the benefit of pulse flour to glycemic response, and promoting the benefit of pulse flours to the food industry.

Developing Cold-Hardy Wine Grapes with Early Acclimation Stability **• Project Budget:** $81,233.00

Partner with North Dakota State University to determine those accessions capable of advancing to secondary screening and ultimately the release of a cold-hardy red/white wine grape for the entire state by evaluating over 200 fruiting accessions enological characteristics and identifying parental V.riparia biotypes with stable early acclimation characteristics.

Development of Superior Juneberry Cultivars **• Project Budget:** $41,815.00

Partner with North Dakota State University to increase access to superior native juneberry biotypes and fruit availability by comparing growth and yield attributes of native accessions to Canadian commercial standards and to select those accessions that should proceed on the path to variety release.

Increasing Consumption of Edible Beans by Creating Bean Flours **• Project Budget:** $68,620.00

Partner with North Dakota State University to optimize the milling of edible beans into different flour types by developing a dry milling system capable of grinding dry bean into a whole grain flour, producing baked products, snack products, and extruded products from different types of bean flours obtained during milling while assessing the sensory properties of these products, and increasing the knowledge of dry bean utilization at professional trade organizations and two workshops on dry bean milling and the application of bean flours in non-traditional food applications.

Potato Yield response and Nitrogen Losses as Influenced by Nitrogen Management and Cultivar • **Project Budget:** $68,803.00

Partner with North Dakota State University to increase potato yield and nitrogenous fertilizer use efficiency through fertilizer nitrogen (N) application rate, timing and additions of nitrification and urease inhibitor by determining the best fertilizer N management practices to enhance tuber yield, petiole N and N use efficiency of two popular potato cultivars, determining the soil nitrogen availability or inorganic N mineralization rate as influenced by N management, comparing soil N leaching loss under different N management treatments as measured by suction lysimeters installed at 3 feet, estimating ammonia (NH3) volatilization loss from fertilizer-N managed plots as measured by acid trap, determining the control of N-management on denitrification-N loss (N2O-N), and determining root morphological and dry matter accumulation differences between the two cultivars with various N treatments.

Soybean Cyst Nematode Outreach and Characterization of the Genetic Basis for Resistance in Dry Bean • **Project Budget:** $100,000.00

Partner with North Dakota State University to develop soybean cyst nematode resistant dry bean cultivars by determining the genetics of resistance through classical breeding and then the resistance quantitative trait loci (QTL's), and identifying markers linked to the QTL's for use in marker assisted selection when screening for resistance in dry bean breeding programs.

Evaluating Apples (Edible and Ornamental) for North Dakota Commercial Nursery and Orchard Industries • **Project Budget:** $98,075.00

Partner with North Dakota State University to provide specialty crop beneficiaries with essential updated and current information on cultivar selection, root stock selection, best management practices and culinary uses by providing best management practices based on organic vs. conventional apple orchard production, determining disease pressures on apple (ornamental and edible) across North Dakota affecting commercial and residential plantings, conducting varietal trials of edible and ornamental apple cultivars that are potentially suitable for use in North Dakota, conducting rootstock trials that are potentially suitable for orchard (commercially and residential) and landscape use, and understanding how to balance weed control and soil quality for optimal tree performance, fruit yield and quality in a new apple orchard in North Dakota.

Hops Viability in Central North Dakota • **Project Budget:** $2,995.50

Partner with Glendon Philbrick to test five varieties of hops rhizomes to determine where a variety of hops will yield, how much will the variety yield, winter survival rate, and quality of the crop produced by assessing the climate viability of each rhizome variety and assessing the quality of the yield.

Aneta Community Orchard and Gardens • **Project Budget:** $42,820.59

Partner with the Aneta Specialty Crop Group to expand the Aneta Community Orchard and Gardens by increasing production and consumption of specialty crops through garden plots, specialty crop tours, and outreach trainings.

Improving Arthropod Pest Management on Grapes in North Dakota • **Project Budget:** $105,665.00

Partner with North Dakota State University to increase knowledge of integrated pest management (IPM) and beneficial arthropods associated with grapes and improve awareness of how management practices can impact these arthropods by documenting the grape arthropod fauna in North Dakota and investigating how relevant species are affected by crop management practices, including chemical application and plant diversity.

Japanese Beetle Project • **Project Budget:** $87,696.00

Eradicate Japanese beetles in North Dakota by determining the extent of interceptions of Japanese beetle in North Dakota, locating possible sources of the beetles, determining if there is a overwintering population of Japanese beetles in North Dakota, performing delimiting surveys and eradication work, and using the outcomes to best establish a pest response and/or quarantine to protect the nursery industry of North Dakota.

Administration • **Project Budget:** $212,589.88 **Indirect Costs:** $29,476.00

Ensure that the State Agency and sub-awardees abide by Federal and State requirements and regulations by performing pre-award and post-award activities to administer Specialty Crop Block Grant Program funding.